SIEMENS

Product Overview

RUGGEDCOM RS910L

Serial and Ethernet Device Server With Ethernet Over VDSL Uplink, 128-bit Encryption

The RUGGEDCOM RS910L from Siemens is a utility grade serial device server and managed Ethernet switch supporting Ethernet over VDSL (EoVDSL). The RS910L can be configured with 2 serial ports (RS485/RS422/RS232) and/or 2 Ethernet ports (copper of fiber) and can interconnect multiple types of intelligent electronic devices (IEDs) that have different methods of communications. The EoVDSL port allows for aggregation of these devices at a remote location back to the central control room using existing telephone grade cable (or other legacy serial cabling). The EoVDSL uplink allows up to 5km LAN segments at up to 35Mbps. It is the perfect solution for bringing Ethernet networking to serial devices and applications where existing wiring is already present thus saving the considerable cost of upgrading existing legacy devices or installing new network cabling.

Designed to operate reliably in harsh environments the RS910L provides a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found in electric utility substations, curb side traffic control cabinets, and factory floors. An operating temperature range of -40°C to +85°C coupled with hazardous location compliance, optional conformal coating and a galvanized steel enclosure allows the RS910L be placed in almost any location.

The RS910L provides an integrated power supply with a wide range of voltages (88-300VDC or 85-264VAC) for worldwide operability or dual-input, reversible polarity, 12VDC, 24VDC and 48VDC power supply inputs for high availability applications requiring backup power inputs.

The embedded Rugged Operating System (ROS) provides advanced cyber security features and comprehensive networking functions, providing a full array of intelligent functionality for high network availability and manageability. Coupled with ruggedness and durability that is designed in from the onset, the RS910L is ideal for creating mission-critical, real-time, control applications where high reliability and availability is of paramount importance.

All RUGGEDCOM products are backed by a five year warranty and unsurpassed technical support.

usa.siemens.com/ruggedcom

Features and Benefits

Interface Ports

- 1 Ethernet over VDSL (EoVDSL) interface
- 2 serial and/or 2 Fast Ethernet ports
- RS485/RS422/RS232 Serial Ports (DB9 or RJ45)
- Serial fiber interface (ST) available
- 10/100BaseTX or 100BasesFX Ethernet ports

Ethernet Over VDSL Characteristics

- Up to 5km LAN segments
- Symmetric data rates up to 35Mbps
- Asymmetric data rates up to 40Mbps
- Automatically selects fastest data rate based on distance and quality of cable
- Software selectable to be master or slave
- Frequency Division Multiplexing (FDM)

Cyber Security Features

- Multi-level user passwords
- SSH/SSL/SFTP (128-bit encryption)
- Enable/disable ports, MAC based port security
- Port based network access control (802.1x)
- VLAN (802.1Q) to segregate and secure network traffic
- RADIUS centralized password management
- SNMPv3 authentication and 56-bit encryption

Rugged Rated for Reliability in Harsh Environments

- Immunity to EMI and heavy electrical surges
  - Meets IEEE 1613 (electrical utility substations)
  - Exceeds IEEE 61850-3 (electrical utility substations)
  - Exceeds IEC 61800-3 (variable speed drive systems)
  - Exceeds IEC 61000-6-2 (generic industrial)
  - Exceeds NEMA TS-2 (traffic control equipment)
- -40 to +85°C operating temperature (no fans)
- 20 AWG galvanized steel enclosure
- DIN or panel mounting options provide secure mechanical reliability
- Hazardous Locations: Class 1, Division 2

Rugged Operating System (ROS) Features

- Simple plug and play operation – automatic learning, negotiation, and crossover detection
- MSTP (802.1Q - 2005, formerly 802.1s)
- RSTP (802.1D-2004) and Enhanced Rapid Spanning Tree (eRSTP) network fault recovery (<5ms)
- Quality of Service (802.1p) for real-time traffic
- VLAN (802.1Q) with double tagging and GVRP support
- Link aggregation (802.3ad)
- IGMP snooping for multicast filtering
- Port rate limiting and broadcast storm limiting
- Port configuration, status, statistics, mirroring, security
- SNTP time synchronization (client and server)

Universal Power Supply Options

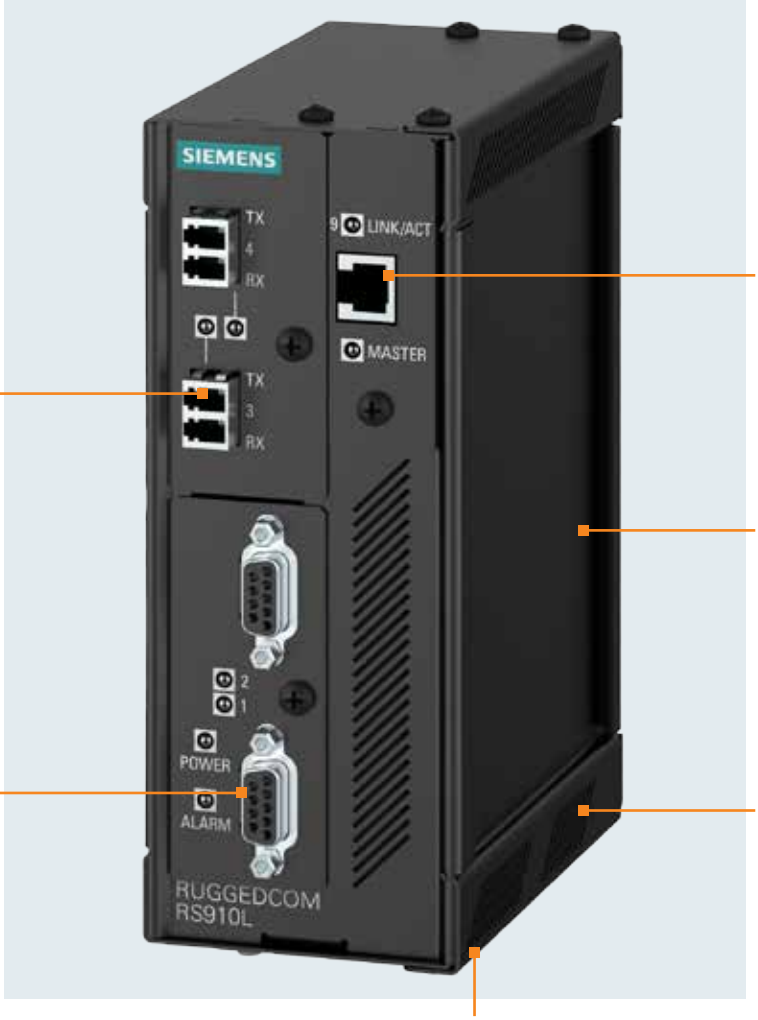
- Fully integrated power supply (no external adaptors)
- Universal high-voltage range: 8-300VDC or 85-264VAC
- Dual low-voltage DC inputs: 24VDC (10-36VDC) or 48VDC (36-72VDC)
- Terminal blocks for reliable maintenance free connections
- CSA/UL 60950 safety approved to +85°C

RUGGEDCOM RS910L

Operating Temperature
- -40°C to +85°C
- No fans

Ethernet Ports
- 2 10/100BaseTX or 100BaseFX
- Fiber optical (MMF/SMF)
- Multiple fiber connector types

Serial Ports
- 2 RS485/RS422/RS232
- DB9 or RJ45
- Up to 230kbp
- Serial fiber interface option



EoVDSL Port
- One EoVDSL port standard
- RJ11 connector
- Symmetric data rates up to 35Mbps

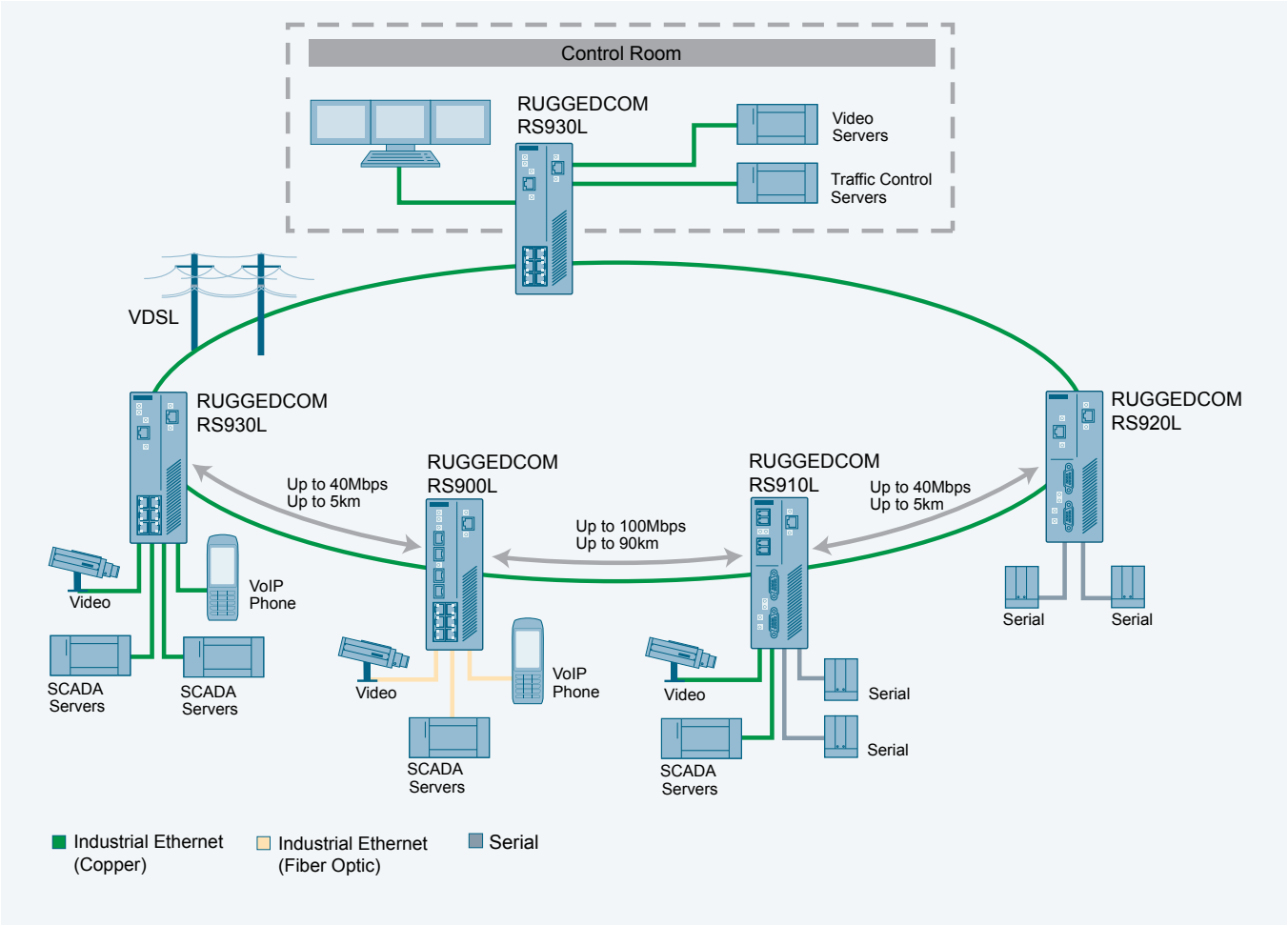
Rugged Construction
- 20 AWG galvanized steel enclosure
- Conformal coating (optional)

Integrated Power Supply
- Universal high-voltage range: 88-300VDC or 85-264VAC
- Popular low voltage DC ranges: 24VDC, 48VDC
- Dual isolated DC power inputs

Critical Alarm Relay
- Form-C failsafe contact relay: 1A@30VDC

Mounting Options
- DIN rail
- Panel mount

Network Architecture



RS900L

8 Port Managed Switch with Ethernet over VDSL Uplink

- 1 Ethernet over VDSL interface
- Up to 8 fast Ethernet ports
- Copper and fiber options
- Use to aggregate Ethernet enabled devices at remote locations back to a central point

RS910L

Serial and Ethernet Device Server with Ethernet over VDSL Uplink

- 1 Ethernet over VDSL interface
- 2 RS485/RS422/RS232 Serial ports (DB9 or RJ45)
- Optional 2 Ethernet ports – copper of fiber
- Use to network enable legacy serial devices at remote locations

RS920L

Dual Port Ethernet over VDSL with Integrated Dual Port Serial Server

- 2 Ethernet over VDSL interfaces
- 2 RS485/RS422/RS232 Serial ports (DB9 or RJ45)
- Use as a serial drop point for a ring or bus network topology

RS930L

6 Port Managed Switch with Dual Port Ethernet over VDSL Uplink

- 2 Ethernet over VDSL interfaces
- 6 Port Managed Ethernet Switch – copper interfaces
- Use as an Ethernet drop point for a ring or bus network topology
- Span over hundreds of kilometers using existing telephone grade cables

ROS Features

Serial IP Encapsulation

Many 'legacy' devices (RTU, PLC, IED, etc.) only support serial communications via RS232, RS422 or RS485. ROS encapsulates the serial data within a TCP connection allowing these devices to be reached via an IP network. A wide range of baud rates, frame packetization options, and diagnostics allows any serial protocol to function. The RS910W has specific support for the following serial protocols:

- Raw socket serial encapsulation
- Modbus TCP (client and server)
- DNP 3
- WIN and TIN
- Microlok

MODBUS TCP

The Modbus protocol is ubiquitous in the industrial control and automation world. ROS converts Modbus RTU master/slave serial data packets to Modbus TCP client/server packets for transmission over an IP network. This allows communications to Modbus RTU slaves via Ethernet and allows multiple masters to poll the same slave device.

Cyber Security

Cyber security is an urgent issue in many industries where advanced automation and communications networks play a crucial role in mission critical applications and where high reliability is of paramount importance. Key ROS features that address security issues at the local area network level include:

- **Passwords** – Multi-level user passwords secures switch against unauthorized configuration
- **SSH / SSL** – Extends capability of password protection to add 128-bit encryption of passwords and data as they cross the network
- **Enable/Disable ports** – Capability to disable ports so that traffic can not pass
- **802.1Q VLAN** – Provides the ability to logically segregate traffic between predefined ports on switches
- **MAC based port security** – The ability to secure ports on a switch so only specific Devices / MAC addresses can communicate via that port
- **802.1x port based network access control** – The ability to lock down ports on a switch so that only authorized clients can communicate via this port
- **RADIUS** – authentication service using MD5 hash and providing centralized password management
- **SNMPv3** – encrypted authentication access security and data encryption (CBC-DES with 56-bit encryption key)
- **Secure socket layer** – Web-based management using SSL with data encryption (128-bit encryption key)
- **RSA** – 1024 bit key for key management and key exchange
- **TACACS+** – Terminal Access Control and Accounting Services. Client provides encrypted authentication and authorization
- **Point to Point (PPP)** – using CHAP (MD5 Hash) authentication service
- **SFTP** – Secure File Transfer Protocol using SSH encryption

The ROS cyber security features are included to help address the various industry specific security standards such as NERC CIP, ISA S99, AGA 12, IEC 62443, ISO 17799:2005 and PCSRF SPP-ICS.

Enhanced Rapid Spanning Tree Protocol (eRSTP)

RUGGEDCOM eRSTP allows the creation of fault-tolerant ring and mesh Ethernet networks that incorporate redundant links that are 'pruned' to prevent loops. eRSTP yields worst-case fault recovery [1] of 5ms times the 'bridge diameter' and allows rings of up to 160 switches. For example, a ring of ten switches will have fault recovery times under 50ms. eRSTP implements both STP and RSTP to ensure interoperability with commercial switches unlike other proprietary 'ring' solutions.

Quality of Service (IEEE 802.1p)

Some networking applications such as real-time control or VoIP (voice over IP) require predictable arrival times for Ethernet frames. Switches can introduce latency in times of heavy network traffic due to the internal queues that buffer frames and then transmit on a first come first serve basis. ROS supports 'Class of Service' in accordance with IEEE 802.1p that allows time critical traffic to jump ahead to the front of the queue thus minimizing latency and reducing jitter to allow such demanding applications to operate correctly. ROS allows priority classification by port, tags, MAC address, and IP type of service (ToS). A configurable "weighted fair queuing" algorithm controls how frames are emptied from the queues.

VLAN (IEEE 802.1Q)

Virtual local area networks (VLAN) allow the segregation of a physical network into separate logical networks with independent broadcast domains. A measure of security is provided since hosts can only access other hosts on the same VLAN and traffic storms are isolated. ROS supports 802.1Q tagged Ethernet frames and VLAN trunks. Port based classification allows legacy devices to be assigned to the correct VLAN. GVRP support is also provided to simplify the configuration of the switches on the VLAN.

Link Aggregation (802.3ad)

The link aggregation feature provides the ability to aggregate several Ethernet ports into one logical link (port trunk) with higher bandwidth. This provides an inexpensive way to set up a high speed backbone to improve network bandwidth. This feature is also known as "port trunking," "port bundling," "port teaming," and "Ethernet trunk."

[1] eRSTP fault recovery times may be approximated as follows:
For 100 Mbps, fault recovery performance is <5ms/hop
For 1,000 Mbps, fault recovery performance is <5ms/hop + 20ms

ROS Features

IGMP Snooping

ROS uses IGMP snooping (Internet Group Management Protocol v1&v2) to intelligently forward or filter multicast traffic streams (e.g. MPEG video) to or from hosts on the network. This reduces the load on network trunks and prevents packets from being received on hosts that are not involved. ROS has a very powerful implementation of IGMP snooping that:

- Can be enabled on a per VLAN basis
- Detects and filters all multicast streams regardless of whether subscribers exist
- Supports "router-less" operation by supporting an "active" mode
- Restores traffic streams immediately after an RSTP topology change

SNMP (Simple Network Management Protocol)

SNMP provides a standardized method for network management stations the ability to interrogate devices from different vendors. SNMPv3 in particular provides security features such as authentication, privacy with data encryption (CBC-DES with 56-bit encryption key) and access control not present in earlier SNMP versions. ROS also supports numerous standard MIBs (Management Information Base) allowing for easy integration with any network management system (NMS). A feature of SNMP supported by ROS is the ability to generate "traps" upon system events. RUGGEDCOM NMS, the RUGGEDCOM management solution, can record traps from multiple devices providing a powerful network trouble-shooting tool. It also provides a graphical visualization of the network and is fully integrated with all RUGGEDCOM products.

SCADA and Industrial Automation

ROS contains features that optimize network performance and simplify switch management based on the unique requirements found in SCADA and industrial automation applications. Features such as Modbus TCP management for retrieval of switch data using the ubiquitous Modbus protocol and DHCP Option 82, a Rockwell Automation ODVA requirement for IP address assignment based on the location of the end device, provide capabilities not found in typical "commercial" or "office grade" Ethernet switches.

Port Based Network Access Control (802.1x)

ROS supports the IEEE 802.1x standard that defines a mechanism for port-based network access control which provides a means of authenticating and authorizing devices attached to LAN ports.

Port Rate Limiting

ROS supports configurable rate limiting per port to limit unicast and multicast traffic. This can be essential to managing precious network bandwidth for service providers. It also provides edge security for denial of service (DoS) attacks.

Broadcast Storm Filtering

Broadcast storms wreak havoc on a network and can cause attached devices to malfunction. This could be disastrous on a network with mission critical equipment. ROS limits this by filtering broadcast frames with a user-defined threshold.

Port Statistics and RMON (Remote Monitoring)

ROS provides continuously updating statistics per port that provide both ingress and egress packet and byte counters as well as detailed error figures. Also provided is full support for the RMON statistics, history, alarms, and event groups. RMON allows for very sophisticated data collection, analysis and detection of traffic patterns.

Event Logging and Alarms

ROS records all significant events to a non-volatile system log allowing forensic troubleshooting. Events include link failure and recovery, unauthorized access, broadcast storm detection, and self-test diagnostics among others. Alarms provide a snapshot of recent events that have yet to be acknowledged by the network administrator. An external hardware relay is de-energized during the presence of critical alarms allowing an external controller to react if desired.

HTML Web Browser and Telnet/SSH User Interfaces

ROS provides a simple, intuitive user interface for configuration and monitoring via a standard graphical web browser or via Telnet/SSH. All system parameters include detailed on-line help to make setup a breeze. ROS, presents a common look and feel and standardized configuration process allowing easy migration to other RUGGEDCOM managed products.

Configuration Via ASCII Text File

All configuration parameters are stored in an ASCII formatted text file that can easily be transferred via TFTP, SFTP or Xmodem. The configuration file can be saved for backup purposes and easily manipulated by a text editor. The same text file can be downloaded to the switch at a later date in order to re-configure or restore a previous configuration.

Command Line Interface (CLI)

A command line interface can be used in conjunction with remote shell to automate data retrieval, configuration updates, and firmware upgrades. A powerful SQL-like capability allows expert users the ability to selectively retrieve or manipulate any parameters the device has to offer.

EMI and Environmental Type Tests

IEC 61850-3 EMI Type Tests				
Test	**Description**		**Test Levels**	**Severity Levels**
IEC 61000-4-2	ESD	Enclosure contact	+/- 8kV	4
		Enclosure air	+/- 15kV	4
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	Note 1
IEC 61000-4-4	Burst (fast transient)	Signal ports	+/- 4kV @ 2.5kHz	Note 1
		D.C. power ports	+/- 4kV	4
		A.C. power ports	+/- 4kV	4
		Earth ground ports [3]	+/- 4kV	4
IEC 61000-4-5	Surge	Signal ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
		D.C. power ports	+/- 2V line-to-earth, +/- 1kV line-to-line	3
		A.C. power ports	+/- 4V line-to-earth, +/- 2kV line-to-line	4
IEC 61000-4-6	Induced (conducted) RFI	Signal ports	10V	4
		D.C power ports	10V	3
		A.C power ports	10V	3
		Earth ground ports [3]	10V	3
IEC 61000-4-8	Magnetic field	Enclosure ports	40 A/m continuous, 1000 A/m for 1 s	Note 1
			1000 A/m for 1 s	5
IEC 61000-4-29	Voltage dips and interrupts	D.C. power ports	30% for 0.1s, 60% for 0.1s, 100% for 0.05s	N/A
		A.C. power ports	30% for 1 period, 60% for 50 periods	N/A
IEC 61000-4-11			100% for 5 periods, 100% for 50 periods	N/A
IEC 61000-4-12	Damped oscillatory	Signal ports	2.5kV common, 1kV diff. mode@1MHz	3
		D.C. power ports	2.5kV common, 1kV diff. mode@1MHz	3
		A.C. power ports	2.5kV common, 1kV diff. mode@1MHz	3
IEC 61000-4-16	Mains frequency voltage	Signal ports	30V Continuous, 300V for 1s	4
		D.C. power ports	30V Continuous, 300V for 1s	4
IEC 61000-4-17	Ripple on D.C. power supply	D.C. power ports	10%	3
IEC 60255-5	Dielectric strength	Signal ports	2k V AC (Fail-safe relay output)	N/A
		D.C. power ports	1.5V DC	N/A
		A.C. power ports	2k V AC	N/A
IEC 60255-5	H.V. impulse	Signal ports	5kV (Fail-safe relay output)	N/A
		D.C. Power ports	5kV	N/A
		A.C. Power ports	5kV	N/A

IEEE 1613 (C37.90.x) EMI Immunity Type Tests [2]				
Test	**Description**		**Test Levels**	**Severity Levels**
IEEE C37.90.3	ESD	Enclosure contact	+/-2kV, +/-4kV, +/- 8kV	N/A
		Enclosure air	+/-4kV, +/-8kV, +/-15kV	N/A
IEEE C37.90.2	Radiated RFI	Enclosure ports	35 V/m	N/A
IEEE C37.90.1	Fast transient	Signal ports	+/- 4kV @ 2.5kHz	N/A
		D.C. power ports	+/- 4kV	N/A
		A.C. power ports	+/- 4kV	N/A
		Earth ground ports [3]	+/- 4kV	N/A
IEEE C37.90.1	Oscillatory	Signal ports	2.5kV common mode@1MHz	N/A
		D.C. power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
		A.C. power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
IEEE C37.90	H.V. impulse	Signal ports	5kV (Fail-safe relay output)	N/A
		D.C. power ports	5kV	N/A
		A.C. power ports	5kV	N/A
IEEE C37.90	Dielectric strength	Signal ports	2k V AC	N/A
		D. C. power ports	1.5k V DC	N/A
		A. C. power ports	2k V AC	N/A

Environmental Type Tests				
Test	**Description**		**Test Levels**	**Severity Levels**
IEC 60068-2-1	Cold temperature	Test Ad	-40°C, 16 hours	N/A
IEC 60068-2-2	Dry heat	Test Bd	+85°C, 16 hours	N/A
IEC 60068-2-30	Humidity (damp heat, cyclic)	Test Db	95% (non-condensing), 55°C , 6 cycles	N/A
IEC 60255-21-1	Vibration	Test Fc	2g @ (10 - 150) Hz	Class 2 [2]
IEC 60255-21-2	Shock	Test Ea	30g @ 11mS	Class 2 [2]

[1] RUGGEDCOM specified severity levels.

[2] Class 2 refers to "Measuring relays and protection equipment for which a very high security margin is required or where the vibration levels are very high, (e.g. shipboard application and for severe transportation conditions").

[3] Only applicable to functional earth connections separated from the safety earth connection.

Technical Specifications

Power Supply

- Power consumption: 10W max
- 24VDC: 10-36VDC, 0.4A
- 48VDC: 36-72VDC, 0.2A
- HI voltage AC/DC: 88-300VDC, 85-264VAC, 0.1A

Critical Alarm Relay

- Form-C failsafe contact relay: 1A@30VDC

Physical Dimensions

- Height: 7.4" (192mm)
- Width: 2.6" (66mm)
- Depth: 5.0" (127mm)
- Weight: 1.22kg
- Ingress protection: IP40 (1mm objects)
- Enclosure: 20 AWG galvanized steel enclosure
- Mounting: DIN rail or panel mounted

Switch Properties

- Switching method: Store and forward
- Switching latency: 8 us (100Mbps)
- Switching bandwidth: 1.8 Gbps
- MAC address table size: 16kbytes
- Priority queues: 4
- Frame buffer memory: 1 Mbit
- Simultaneous VLANs: 255
- VLAN ID range: 1 to 4094
- IGMP and static multicast groups: 256
- Port rate limiting: 128kbps, 256, 512, 4, 8Mbps
- No head of line blocking

Regulatory Approvals

- ISO: Designed and manufactured using a ISO9001: 2000 certified quality program
- CE marking
- Emissions: FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
- Safety: cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN60950)
- Laser eye safety (FDA/CDRH): Complies with 21 CFR Chapter 1, Subchapter J

Network Management

- HTTPS graphical web-based, SSL (128-bit encryption)
- SNMP v1, v2c, v3 (56-bit encryption)
- Telnet, VT100, SSH/SFTP (128-bit encryption)
- Command Line Interface (CLI)
- RSA key management (1024 bit key)
- Authentication and accounting – TACACS+ (encrypted), RADIUS client, PPP

Warranty

- 5 Years – Applicable to design and manufacturing related product defects.

EMI Immunity and Environmental Compliance

- IEC 61000-6-2 Industrial (Generic)
- IEC 61800-3 Industrial (Variable Speed Drive Systems)
- IEC 61850-3 Electric Utility Substations
- IEEE 1613 Electric Utility Substations
- NEMA TS 2 Traffic Control Equipment
- Hazardous Locations: Class 1, Division 2

IEEE Compliance

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 802.3x-Flow Control
- 802.3z-1000BaseLX
- 802.3ab-1000BaseTX
- 802.3ad-Link Aggregation
- 802.1D-MAC Bridges
- 802.1D-Spanning Tree Protocol
- 802.1p-Class of Service
- 802.1Q-VLAN Tagging
- 802.1D-2004-Rapid Spanning Tree Protocol
- 802.1x-Port Based Network Access Control
- 802.11 b/g WLAN
- 802.11i Security 128-bit AES encryption
- 802.1Q-2005 (formerly 802.1s) MSTP

IETF RFC Compliance

- RFC768-UDP
- RFC783-TFTP
- RFC791-IP
- RFC792-ICMP
- RFC793-TCP
- RFC826-ARP
- RFC854-Telnet
- RFC894-IP over Ethernet
- RFC1112-IGMP v1
- RFC1519-CIDR
- RFC1541-DHCP (client)
- RFC2030-SNTP
- RFC2068-HTTP
- RFC2236-IGMP v2
- RFC2284-EAP
- RFC2475-Differentiated Services
- RFC2865-RADIUS
- RFC3414-SNMPv3-USM
- RFC3415-SNMPv3-VACM

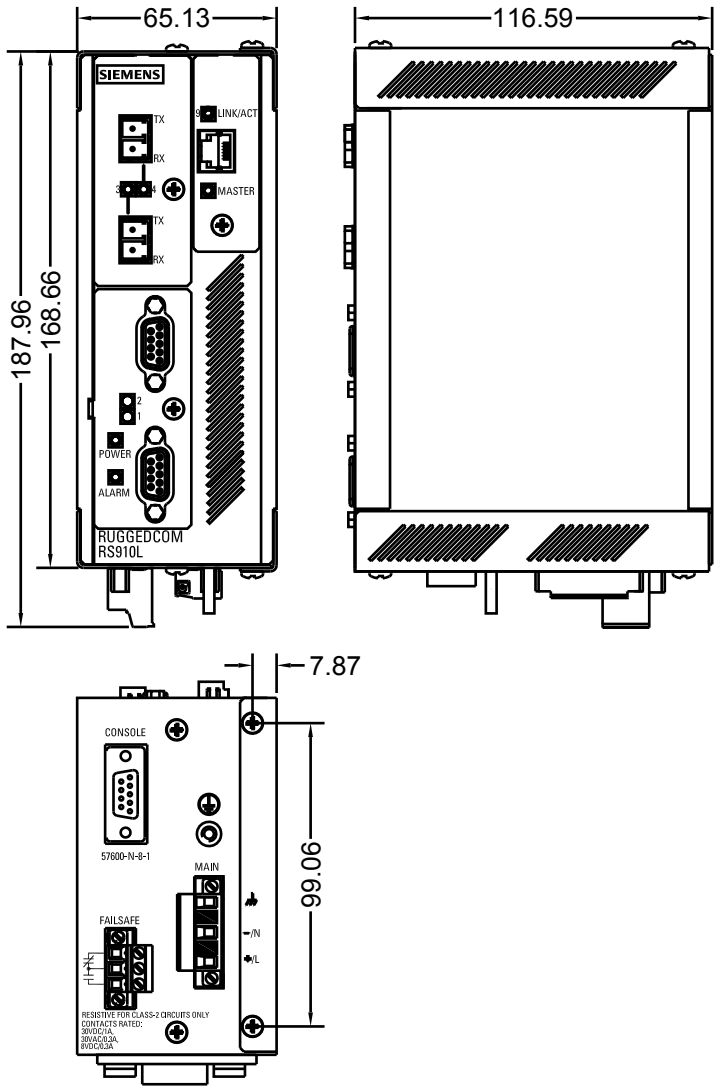
IETF SNMP MIBS

- RFC1493-BRIDGE-MIB
- RFC1907-SNMPv2-MIB
- RFC2012-TCP-MIB
- RFC2013-UDP-MIB
- RFC2578-SNMPv2-SMI
- RFC2579-SNMPv2-TC
- RFC2819-RMON-MIB
- RFC2863-IF-MIB
- draft-ietf-bridge-rstpmib-03-BRIDGE-MIB
- draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB
- ANAifType-MIB

Fiber Specifications and Dimension Drawings

Fiber Optical Specifications				
Parameter	**Fiber Port Type**			
Mode	Multimode	Singlemode	Singlemode	Singlemode
Connector	MTRJ, ST, SC	LC, SC, ST	LC, SC, ST	LC, SC, ST
Typical dist. (km)	2	20	50	90
Optical wavelength (nm)	1310	1310	1310	1310
Cable size core/cladding (um)	50 / 125 or 62.5 / 125	8 / 125 or 9 / 125	8 / 125 or 9 / 125	8 / 125 or 9 / 125
TX power (min/max) (dBm)	-9.5 / -4	-9/-3	-7 / -3	0 / 5
RX sensitivity (dBm)	-15.7	-15.5	-2.5	-2.5
RX saturation (dBm)	-33.5	-32	-37	-39
Typical budget (dB)	17	16.5	34.5	41.5

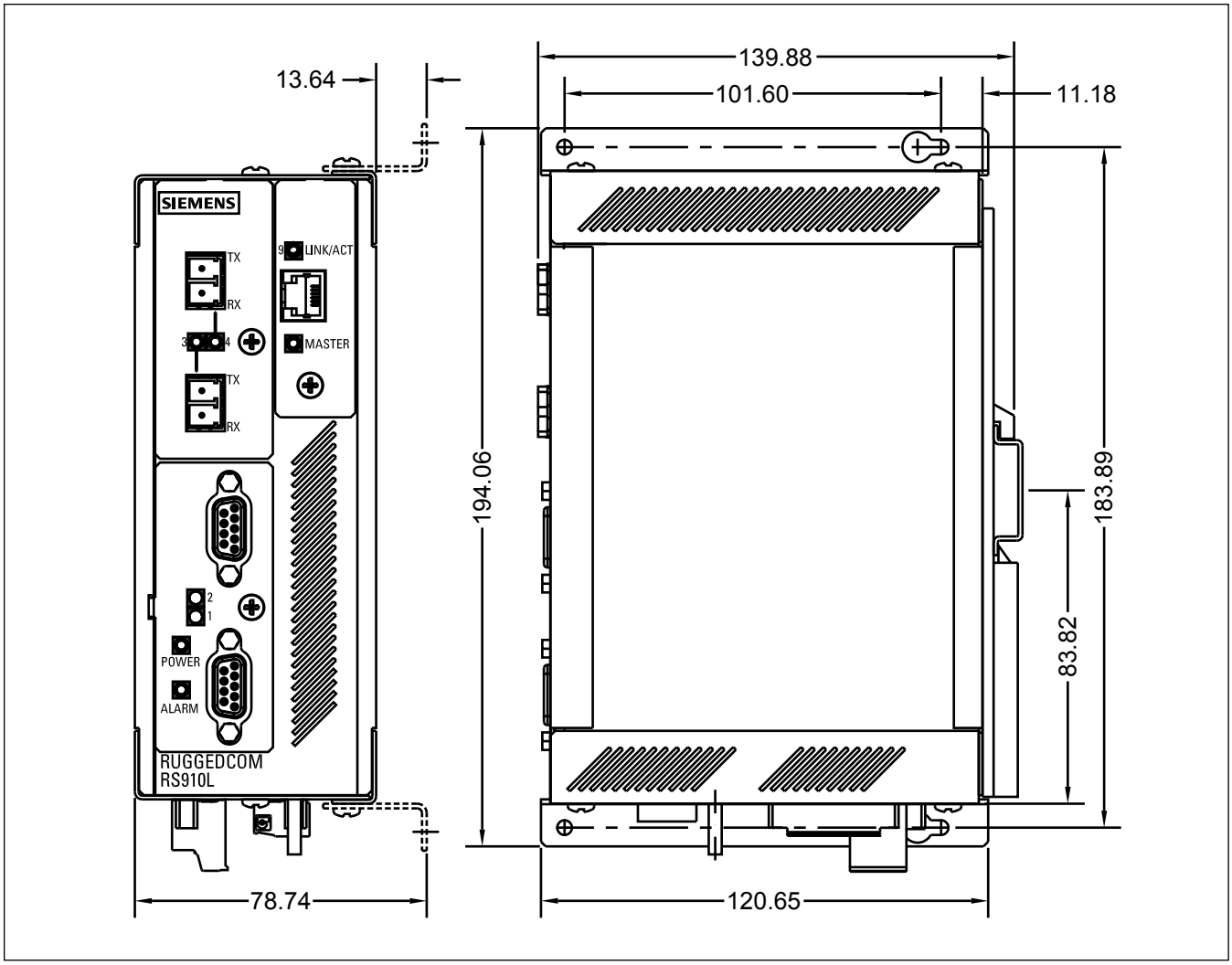
Longer segment lengths dependent on fiber specifications. Consult factory for further details.



Overall dimensions

All dimensions are in millimeters, unless otherwise stated.

Dimension Drawings



Panel and DIN rail mount dimensions

All dimensions are in millimeters, unless otherwise stated.

Order Codes

6GK60910AD2	_____	- 0 -	_____	- A -	_____	- Z	____	+ ____	+ _____
	PS1		Mount		MOD		S	E	V V

PS1: Power Supply 1
1 = 24 VDC (10-36 VDC)
2 = 48 VDC (36-72 VDC)
3 = 87-264VAC or 88-300VDC

Mount: Mounting Options
A = No mounting option
B = DIN rail mounting
C = Panel mounting

MOD: Manufacturing Modifications
0 = None
1 = Conformal coating

S: Serial Port Options
A00 = None
A01 = 2 x RS232/422/485 DB9
A02 = 2 x RS232/422/485 RJ45
A03 = 2 x Fiber 850nm ST

E: Additional Ethernet Ports
B00 = None
B01 = 2 x 10/100TX RJ45
B02 = 2 x 10FL - Multimode, 850 nm, ST connectors
B03 = 2 x 100FX - Multimode, 1300 nm, ST connectors
B04 = 2 x 100FX - Multimode, 1300 nm, SC connectors
B05 = 2 x 100FX - Multimode, 1300 nm, MTRJ connectors
B06 = 2 x 100FX - Multi mode, 1300nm, LC connectors
B07 = 2 x 100FX - Singlemode, 1300 nm, ST connectors, 20km
B08 = 2 x 100FX - Singlemode, 1300 nm, SC connectors, 20km
B09 = 2 x 100FX - Singlemode, 1300 nm, LC connectors, 20km
B10 = 2 x 100FX - Singlemode, 1300 nm, SC connectors, 50km
B11 = 2 x 100FX - Singlemode, 1300 nm, LC connectors, 50km
B12 = 2 x 100FX - Singlemode, 1300 nm, SC connectors, 90km

VV: VDSL Interface
C01 = Standard reach (under 2.5km)
C02 = Long reach (5km) Master / CO
C03 = Long reach (5km) / CPE

Power Cables
6GK6000-8BB00-0AA0 – Bare-wire
6GK6000-8BA00-0AA0 – With lugs

Example Order Codes

6GK6091-0AD21-0BA0-Z A01+B00+C01
24VDC Power Supply, DIN Rail Mount, 2 x RS232/422/485 DB9 Serial Ports, Standard reach VDSL Interface

6GK6091-0AD23-0CA1-Z A03+B03+C03
87-264VAC OR 88-300VDC Power Supply, DIN Rail Mount, Conformal Coating, 2 x Fiber 850nm ST Serial Ports, 2 x 100FX - Multimode, 1300 nm, ST connectors, Long Reach (5km) / CPE VDSL Interface

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